

- 25 -

CLAIMS

What is claimed is:

1. A method for preparing nanoscale or amorphous particles comprising the steps
5 of: (1) preparing a mixture comprising one or more active ingredients and solid fat and (2)
pressurizing the mixture comprising one or more active ingredients and solid fat to the
critical pressure or more by adding the gas of a supercritical fluid into the mixture, and
then removing the solid fat from the mixture by releasing out the solid fat together with the
gas of the supercritical fluid

10 2. The method for preparing nanoscale or amorphous particles according to claim 1,
wherein the step (1) comprises: adding one or more active ingredients, solid fat and
optionally one or more surfactants into a reactor and melt-mixing them homogeneously.

15 3. The method for preparing nanoscale or amorphous particles according to claim 1,
wherein the step (1) comprises: adding one or more active ingredients, solid fat and
optionally one or more surfactants into a reactor and melt-mixing them homogeneously;
rapidly cooling the mixture for solidification; pulverizing the solidified mixture; adding
one or more surfactants and/or one or more non-surfactant type anti-coagulating agents or
20 aqueous solution thereof to the pulverized powder and mixing them homogeneously; and
drying the mixed product at room temperature.

25 4. The method for preparing nanoscale or amorphous particles according to claim 1,
wherein the step (1) comprises: adding one or more surfactants and solid fat into a reactor,
and melt-mixing them homogeneously; rapidly cooling the mixture for solidification;
pulverizing the solidified mixture; adding one or more surfactants and/or one or more
non-surfactant type anti-coagulating agents together with one or more active ingredients or
aqueous solution thereof, to the pulverized powder and mixing them homogeneously; and
drying the mixed product at room temperature.

30 5. The method for preparing nanoscale or amorphous particles according to claim 1,
wherein the step (1) comprises: adding one or more active ingredients, solid fat and
optionally one or more surfactants into a reactor, further adding the gas of a supercritical

- 26 -

fluid so as to provide a subcritical or supercritical condition, and then melt-mixing the mixture by heating.

6. The method for preparing nanoscale or amorphous particles according to claim 1, wherein the step (1) comprises: adding one or more active ingredients, solid fat and optionally one or more surfactants into a reactor, pressurizing the mixture to the critical pressure or more by adding the gas of a supercritical fluid into the mixture and then melt-mixing the mixture by heating, and spraying the melted mixture to the atmospheric pressure.

7. The method for preparing nanoscale or amorphous particles according to claim 1, wherein the step (1) comprises: adding one or more active ingredients, solid fat and optionally one or more surfactants into a reactor, pressurizing the mixture to the critical pressure or more by adding the gas of a supercritical fluid and then melt-mixing the mixture by heating, and then pulverizing the melted mixture by spraying it to the atmospheric pressure; adding one or more surfactants and/or one or more non-surfactant type anti-coagulating agents or aqueous solution thereof to the pulverized mixture and mixing them homogeneously; and drying the mixture at room temperature.

8. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein the active ingredient is organic compounds, organometallic compounds, natural extracts, peptides, proteins or polysaccharides that exhibits physiological activities.

9. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein the solid fat is a fat or a mixture of fats maintaining solid phase at the temperature of 30 °C or less and having 40~150 °C of melting point.

10. The method for preparing nanoscale or amorphous particles according to claim 9, wherein the solid fat is selected from the group consisting of saturated fatty acids, esters and alcohols with C10~C22; mono- or di-glycerides having saturated fatty acid group with C10~C22; hydrocarbons with C16 or more; tri-glycerides having saturated fatty acid group with C10~C22; and a mixture thereof.

- 27 -

11. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein the mixture prepared from the step (1) further comprises one or more material selected from the group consisting of synthetic surfactants, natural surfactants, lipids, polymers, monosaccharides, polysaccharides, dietary fibers, gums and proteins.

12. The method for preparing nanoscale or amorphous particles according to any one of claims 2 to 7, wherein the surfactant is at least one selected from the group consisting of synthetic surfactants, natural surfactants, lipids and polymers.

13. The method for preparing nanoscale or amorphous particles according to any one of claims 3, 4 and 7, wherein the non-surfactant type anti-coagulating agent is at least one selected from the group consisting of monosaccharides, polysaccharides, dietary fibers, gums and proteins.

14. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein a co-solvent is further used in the step (1).

15. The method for preparing nanoscale or amorphous particles according to claim 14, wherein the co-solvent is one or more alcohols with C2~C6.

16. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein the temperature inside the reactor in the step (2) is below the melting point of the solid fat contained in the mixture prepared from the step (1).

17. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein the temperature inside the reactor in the step (2) is 20~40 °C.

18. The method for preparing nanoscale or amorphous particles according to any one of claims 1 to 7, wherein, in the step (2), the solid fat is removed from the mixture comprising one or more active ingredients and solid fat under 70~400atm by adding the gas of a supercritical fluid to the mixture.